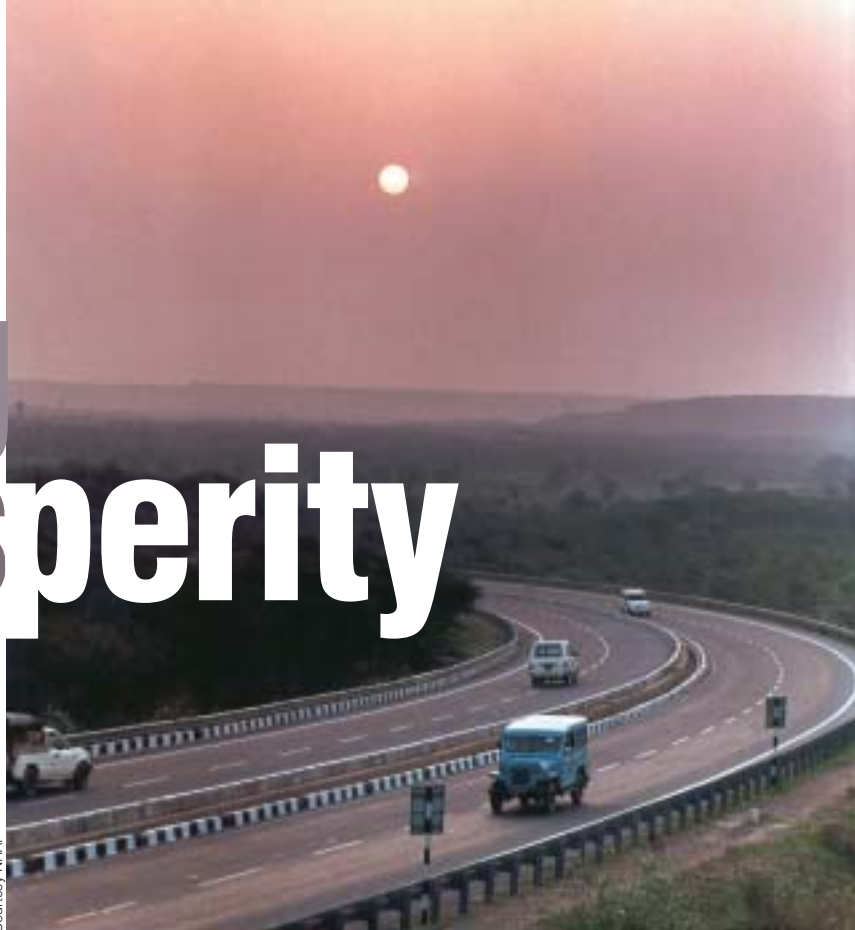


Indian Highways Planning for Prosperity

By SUDIPT ARORA

Courtesy NHAI



Small cars, rattling buses and gaily-painted trucks roar along amid clusters of motorcycles and rickshaws, while farm tractors pull trailers with up to 20 travelers apiece. Families swarm both shoulders of the road while kids play on the busy roadway itself.

Welcome to the Indian road network!

But radical changes are underway. Smooth, pristine roads are coming up, connecting major cities, providing traffic flows of more than 90 kilometers per hour and emergency medical teams on standby for accidents. India is witnessing one of the world's largest road building projects, worth more than Rs. 1,720 billion. At present, India has a 3.3 million-kilometer road network, second largest after the United States.

In 2001, four percent of the national highways in India were four-lane, 80 percent were two-lane and the rest were single-lane. The poor quality of Indian roads is exacerbated by congestion, fatigued bridges and culverts, railway crossings, at times unmanned, low safety and very few bypasses. The central gov-

ernment develops, maintains and manages national highways under the National Highways Act, 1956. Recognizing the inadequacy of budgetary outlays to address the rapid growth in traffic, this act was amended in 1995 to allow private participation.

There has been a major shift from railways to road transport in the past decade. About 85 percent of the passengers and 70 percent of the freight traffic use roads, according to the National Highways Authority of India.

Eager to develop a transportation system worthy of its globalizing and increasingly information-driven economy, India is on a highway-building binge, the largest public works initiative since independence.

President A.P.J. Abdul Kalam said while addressing the Parliament this year that the Indian economy requires at least \$150 billion worth of investment in infrastructure over the next decade to catch up with East Asia. Interstate highways are at the core of this. In October 1998 former Prime Minister Atal Bihari Vajpayee promised world-class roads spanning the country. It is India's version of the U.S. Interstate highway initiative undertaken by President Dwight D. Eisenhower in the 1950s. India and the United States signed a Memorandum of Cooperation in April, providing for India to utilize American experience in developing highways and expressways of international standards. The current road plan aims to achieve a network connectivity of around 80 kilometers per square kilometer by 2011. An extra two rupees on every liter of petrol or diesel have been levied to fund the project. It is also backed by the World Bank and other financial institutions.

Most highways do not have adequate bearing capacity for multiaxle and tandem trucks. This has led to rapid deterioration of road surface in many areas. Altogether, India has put in



HEMANT BHATNAGAR

Views of National Highway 8 at Manesar (above) and Gurgaon (left) in Haryana.



Graphic by SHAFAD SOVANI



HEMANT BHATNAGAR

Indian Road Network

	Length (in km)
National highways	65,569
State highways	131,899
Major district roads	467,763
Village and other roads	2,650,000
Total	3.315 million

National highways are less than 2 percent of network but carry 40 percent of total traffic.

Source: NHAI

motion projects for upgrading 20,000 kilometers of roadway.

The government hopes to complete 92 percent of the work on the 5,846-kilometer Golden Quadrilateral linking New Delhi, Mumbai, Chennai and Calcutta with an upgraded and widened four- and six-lane highway by December, a year behind schedule. As of January 31 this year, about 4,500 kilometers were complete. The target for completing the North-South and East-West corridors is 2007.

The first phase of the national highway project will focus on the Golden Quadrilateral (see graphic). Its second phase will target the North-South and East-West corridors, about 7,300 kilometers connecting Kashmir to Kanyakumari, and Silchar in Assam to Porbandar in Gujarat. The third phase is a special package for northeastern states under which 6,396 kilometers of national highways and other roads will be developed at a cost of more than Rs. 73.91 billion, according to the Ministry of Shipping, Surface Transport and Highways.

In its latest drive to speed up the third phase of the National

Highways Development Project, Prime Minister Manmohan Singh's government has allowed the National Highways Authority of India to take investment decisions for individual sub-projects and add more staff. "We'll take the fruits of better connectivity to all parts of the nation and unleash a new wave of development and prosperity, especially in remote and economically backward areas," says Transport Minister T.R. Baalu.

About 75 percent of the work is being done by Indian firms, and the rest by companies from China, Russia, Malaysia and South Africa. The Highways Authority attributes the private sector's strong interest in the project to: ensured revenue repayment, fair bidding and speedy execution.

Most of the new four-lane sections avoid the problem of glaring lights from oncoming traffic by raising the road height on one side of the carriageway. A special intelligent traffic management system has been installed on the Delhi-Jaipur Highway (NH-8). It provides information on weather and traffic flow and helps reduce traffic congestion, environmental degradation, and checks for potential accidents. Emergency call boxes at various points help drivers with information about where they can buy fuel, or directions to the nearest hospital.

Rajiv Tewari, a New Delhi lawyer, is astonished by the changes. He was returning home from Jaipur when his bus left without him after a tea break. "I took a taxi and when the driver heard my story, he suggested I use the emergency call box. The message was conveyed to the bus driver by traffic police. Who could think of anything like that in this country?" he asks. Vikram Grewal, an engineer, is impressed: "It used to take up to seven hours to cover a distance of about 250 kilometers from Jaipur to Delhi. Now, it takes less than five hours even during peak hours."

Better and wider roads have raised expectations among the rural population, too, and among those living close to highways. "As the city progresses, there will be more factories. People will get more facilities, more employment," says Chowdhury Narain Singh, a resident of Rampura village in the Gurgaon district of Haryana.



Widening of National Highway 8 under progress in Haryana (far left); a traveler at an emergency phone booth on the Delhi-Jaipur section (left); the highway traffic management system control room in the same section.

Courtesy NHAI



Below: The first phase construction of the Ahmedabad-Vadodara expressway in Gujarat.

Courtesy NHAI

Adds Subhash Goyal, president of the Indian Association of Tour Operators: "India gets over three million foreign tourists annually and the figure could double if we had better infrastructure. Good highways will definitely give a fillip to the tourism industry. This will have a multiplier effect on the Indian economy."

The highway initiative does not mean that Indians will soon be whizzing around the countryside on limited-access, California-style freeways. In a country of more than one billion people, roughly two-thirds of whom live in rural areas, drivers will share the roads with cows, pedestrians, bicycles and other non-motorized traffic.

The project also faces hurdles relating to land acquisition, poor coordination between the states and the center and the pres-

ence of thousands of religious sites that must be moved to accommodate the wider roads. One of the worst stretches runs from New Delhi to Calcutta along the path of the Grand Trunk Road. It is a dangerous, traffic-choked mess, nowhere more than in Bihar where the hazards include madly careering trucks and buses, wandering livestock, highway robbers and Maoist guerillas in the forest-covered Kaimur Hills.

At the moment, India's national highways are an antiquated, overcrowded two-lane network with one of the world's highest accident rates and a reputation for lawlessness and corruption. Nearly 80,000 deaths are reported annually while 400,000 people are injured, according to the Indian Foundation of Transport Research and Training (IFTRC).

Critics say the euphoria over the Golden Quadrilateral project could be short-lived if critical issues of safety, efficiency and cost-savings to users—largely commercial vehicle operators—are not given attention. Above all, action should be taken to ensure that the carriageway is not damaged by overuse in pursuit of short-term gains. "India can't become an economic power on the strengths of an inefficient support system," says S.P. Singh, senior fellow at the IFTRC.

Compared to the United States, the amount of freight traffic carried by highways in India is quite meager. This is partially due to the poor surface quality of the roads. The Indian automobile industry manufactures a large variety of multiaxle vehicles with turbo-charged engines, but most are exported. Indian industry needs these large freighters to transport goods, but inadequate road infrastructure acts as an economic bottleneck, impeding growth for the manufacturers who would build, and the transporters who would use the large trucks.

Though the highways are now being used for a point-to-point drive by cargo vehicles, it will not be long before the much-

Motor Vehicles

According to the Society of Indian Automobile Manufacturers:

75 million vehicles on Indian roads in 2004

58.5 million were registered as of 2002

The breakup:

41.4 million two wheelers

7.5 million cars and taxis

6.6 million buses

3 million goods vehicles

6.1 million other unregistered vehicles

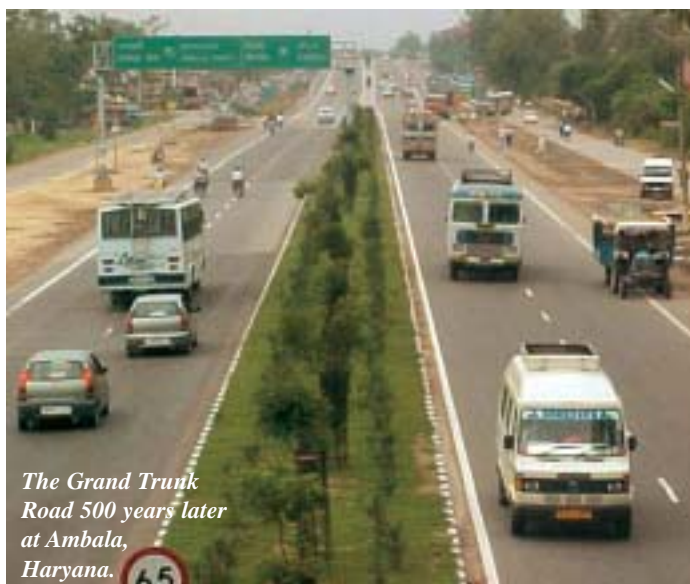
According to the Indian Foundation of Transport Research and Training:

Buses: 750,000 running; 20,000 added in 2003-04; 30,000 being added in 2004-05

Goods vehicles: 3.2 million running; 250,000 added in 2003-04; 275,000 being added in 2004-05.



Courtesy NHAI



The Grand Trunk Road 500 years later at Ambala, Haryana.

India's Original Road Visionary

The Grand Trunk Road connects Calcutta with Amritsar, cuts into Punjab and the Northwest Frontier Province of Pakistan and then through to Kabul in Afghanistan. The highway was built by 16th-century ruler Sher Shah Suri to promote trade. The G.T. Road still acts as the backbone of commerce across India.

The Grand Trunk Road was called the "Road of Hindustan" by Rudyard Kipling. Much of his novel *Kim* is set along this road, which he described as "such a river of life as exists nowhere else in the world."

The road began as a dusty track beaten flat under the hoofs of galloping horses and thumping elephants. Few roads in the world can offer a better living snapshot of so many strata of society. G.T. is a bustling diagonal strip stretching 2,575 kilometers. It was known to 17th-century European travelers as the "Long Walk."

With independence and partition, it became a two-way escape route for 15 million refugees caught between India and Pakistan. Since partition, Pakistan has controlled its 480-kilometer segment between Peshawar and Lahore, while the other 2,000 kilometers link six Indian states. It is this road through which the subcontinent was invaded by conquerors. Hinduism, Jainism, Sikhism, and Buddhism flourished in its environs, and Muslim proselytizers traveled it on their missions. □

debated multimodal carrier system—wherein multiple transportation modes and more than one carrier are used to transport goods—is developed. This would no doubt minimize the wear and tear on the carriageways. However, until such a facility is developed, and if the current axle load stipulations are not strictly enforced, the new highways could soon be potholed.

To protect the Golden Quadrilateral and the North-South Corridor, it is necessary to review the central Motor Vehicles Act, 1988, and reframe rules governing speed and axle load norms for commercial vehicles, says Singh.

In a recent presentation to the government, the transport research foundation pointed out that truck and tire manufacturers should adapt modern technology to improve efficiency and earnings. It said truckers should be able to reduce their turnaround time significantly if the present speed limit of 65 kilometers per hour is raised to 100 kilometers per hour without compromising on the maximum axle load capacity stipulation. The average actual speed varies from 30 to 35 kilometers per hour, mainly due to overloading and poor vehicle technology.

The average speed on Indian highways is around 45 kilometers per hour, less than half of that on the U.S. Interstate system. Coupled with this, there is a problem of low bearing capacities in India. Most road surfaces are flexible pavement bitumen, with bearing capacities one-fourth that of the U.S. Interstate highways. Bitumen pavement was adopted over concrete because high bearing capacity was not needed for passenger movement. Most military equipment in India is transported on rail, unlike in the United States, where the Interstate roads were constructed to enable movement of heavy tanks and artillery, according to a report on the Indian road sector prepared by the Indian Institute of Management in Ahmedabad in 2001.

More than 90 percent of commercial vehicles use conventional cross-ply tires which—with overloading—affect vehicle efficiency. Radial tires would protect roads from wear and tear. With commercial vehicles, the predominant users of highways, it is imperative that the haulage capacity norms are strictly enforced. Indian roads are built for a specified axle load of 10.2 tons, which is also the maximum requirement of the rear axle of a truck as per the Motor Vehicles Act. Permitting anything more would damage the roads faster.

On average, traffic flow has been half of projected levels, which is also a problem. For example, on the Delhi-Noida toll bridge the actual traffic flow was a quarter of the expected flow. User resistance to paying tolls has led to a few projects being unviable.

According to the World Bank, less than 20 percent of the highway development projects are being funded through private sector participation, through Build Operate Transfer (BOT) or annuity concessions, or by setting up a joint venture company to execute a project. Some states have been successful in attracting private sector participation. Madhya Pradesh has entered into many "maintain and transfer" concessions. Andhra Pradesh, Maharashtra, Gujarat, Madhya Pradesh, Rajasthan and Tamil Nadu have all signed BOT concessions and many, including Kerala and Karnataka, have set up Road Development Corporations.

Better roads have brought a change in the habits of middle class families. "There's nothing more refreshing than a long drive to a *dhaba*," remarks Preeti Malhotra, a young fashion designer who makes it a point to visit those on the Kalka-Shimla highway.

The delicacies may extend to Southeast Asian dishes in coming years. To boost trade and tourism, India plans to extend road and rail links to Myanmar, Thailand, Laos, Vietnam, Cambodia, Malaysia and Singapore. □

About the Author: Sudipt Arora is a New Delhi-based senior correspondent with United News of India.